

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

FRM-02601

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

09/600518

INTERNATIONAL APPLICATION NO.
PCT/EP99/00067INTERNATIONAL FILING DATE
08/01/99PRIORITY DATE CLAIMED
28/01/98TITLE OF INVENTION
TEXTILE GRATINGAPPLICANT(S) FOR DO/EO/US
PINTZ, Heiko

Applicant herewith submits to the United States Designated/Elected Office (DO/E/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371) ~~not~~ at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A **copy** of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). (unexecuted)
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
 - (X) Translator Certificate
 - (X) Certificate of Express Mailing No. EL506929441US
 - (X) Information Concerning Elected Offices Notified of their Election
 - (X) Notice Informing the Applicant of the Communication of the International Application to the Designated Offices.

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FRM-02601

CALCULATIONS PTO USE ONLY

17. ☒ The following fees are submitted:**BASIC NATIONAL FEE** (37 CFR 1.492 (a) (1) - (5)) :

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$970.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$840.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$690.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$670.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$96.00

ENTER APPROPRIATE BASIC FEE AMOUNT = \$ 840.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).

| CLAIMS | NUMBER FILED | NUMBER EXTRA | RATE | | |
|---|--------------|--------------|------------|-----------|--|
| Total claims | 8 - 20 = | | X \$18.00 | \$ | |
| Independent claims | 2 - 3 = | | X \$78.00 | \$ | |
| MULTIPLE DEPENDENT CLAIM(S) (if applicable) | | | + \$260.00 | \$ 260.00 | |

TOTAL OF ABOVE CALCULATIONS = \$ 1,100.00

Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).

SUBTOTAL = \$

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).

TOTAL NATIONAL FEE = \$ 1,100.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +

TOTAL FEES ENCLOSED = \$ 1,100.00

Amount to be refunded: \$

charged: \$

- a. ☒ A check in the amount of \$ 1,100.00 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 51136. A duplicate copy of this sheet is enclosed. Ref. FRM-02601

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NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO

Hutchins, Wheeler & Dittmar
Patent Group
101 Federal Street
Boston, MA 02110

SIGNATURE:

Donald W. Muirhead

NAME

33,978

REGISTRATION NUMBER

(37 CFR 1.9(f) & 1.27(c))—SMALL BUSINESS CONCERN

Applicant or Patentee: Heiko PINTZ
 Serial or Patent No.: 09/600,518
 Filed or Issued: July 18, 2000
 Title: TEXTILE GRATING

I hereby declare that I am

- ☐ the owner of the small business concern identified below:
☐ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF SMALL BUSINESS CONCERN Huesker Synthetic GmbH & Co
Fabrikstrasse 13-15, D48712
Gescher, Germany

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in:

- ☐ the specification filed herewith with title as listed above.
☒ the application identified above.
☐ the patent identified above.

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights in the invention must file separate verified statements averring to their status as small entities, and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization having any rights in the invention is listed below:

- ☒ No such person, concern, or organization exists.

Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

ULRICH VON FRANSECKY
 NAME

MANAGING DIRECTOR
 TITLE

Fabrikstrasse 13-15, 48712 Gescher, Germany
 ADDRESS

SIGNATURE

August 28th, 2000
 DATE

WO 99/39055

PCT/EP99/00067

Description:

Textile grating

5 The invention concerns a wide-mesh textile grating for reinforcement purposes in civil engineering, in particular for reinforcing ground layers, comprising weft thread groups and warp thread groups which are preferably connected together by weaving or knitting and which
10 are each at a spacing of at least 8 mm with respect to the respectively adjacent parallel thread group and the individual threads of which are formed by high-strength yarns, wherein the warp thread groups and the weft thread groups of the textile grating are covered by a polymer coating.

15 The invention also concerns a method of producing such a grating.

 Textile gratings of that kind are preferably produced by a weaving procedure. German patent No 20 00 937 discloses a weaving process for a textile grating of that kind, using a leno thread which is passed under a low level of tension in a zigzag configuration over the warp thread groups
20 and which respectively extends at the sides of the warp thread groups under a weft thread group.

 The applicants market a fabric of that kind comprising high-strength polyester threads with a PVC-coating for reinforcing ground layers, under the name 'Fortrac'. A similar polyester fabric with a bitumen-bearing
25 coating is marketed by the applicants for reinforcing asphalt layers in road construction under the trade mark 'HaTelit'. Polyester yarns but also PVA or aramide yarns ensure a long-lasting reinforcing action. Depending on the respective requirements involved however it is also possible to use other synthetic materials, for example polyolefins such as polyethylene or
30 polypropylene, to form the high-strength yarns.

 It will be appreciated that, besides joining the warp thread groups to the weft thread groups by the described weaving procedure using leno threads, it is possible to use other connecting procedures. By way of

example, thread groups which are in mutually superposed relationship and which are not interwoven can be fixed relative to each other by means of leno threads or other binding threads (for example by warp knitting) or by way of adhesive means. Adequate fixing of the finished grating can then
 5 be achieved by means of the polymer coating.

The described reinforcing gratings have extensively proven themselves in civil engineering in the past. By virtue of the high-strength synthetic materials from which the yarns are formed and by virtue of the covering, they afford excellent resistance to rotting and weathering. Their
 10 large meshes provide that, when the gratings are put into position, pieces of the ground or the respective reinforced layer penetrate through the meshes and in that way provide for interlocking engagement and a tight bond between the textile grating and the reinforced layer.

The polymer coating on the known textile gratings is relatively
 15 dense, rigid and inflexible. The high weight by virtue of the high level of density and the rigidity of the grating can give rise to problems in terms of handling the grating during use thereof. The rigid coating means that deformation of the grating itself is possible only to a limited extent. The 'digging-in' engagement between the grating and the reinforced ground
 20 layer therefore occurs solely by virtue of pieces of ground which project through the meshes of the grating. When the grating is being fitted in position or in the installed condition thereof, the rigid and relatively thin polymer coating can suffer from cracks or can partly chip off and flake away so that protection for the thread groups by the polymer coating can
 25 be adversely affected.

The object of the invention is to provide a textile grating and a method for the production thereof, which substantially eliminates the disadvantages described hereinbefore.

That object is attained by a textile grating of the kind set forth in
 30 the opening part of this specification, which is characterised in that regularly distributed gas inclusions are contained in the polymer coating so that the polymer coating has a foam-like structure.

As a direct consequence, the foam-like structure of the polymer coating affords a greater degree of flexibility for the coating as well as a lower level of specific density. The density of the textile grating is reduced in that way so that handling thereof is simplified. The coating also becomes generally softer so that the grating enjoys a higher degree of flexibility whereby handling is again simplified.

As the converse corollary foaming of the polymer coating means that the specific volume thereof is increased so that, even while involving a lower weight, it is possible to embody a greater layer thickness for the polymer coating. The polymer coating layer also enjoys a greater degree of elastic deformability by virtue of the foaming effect. The risk of mechanical damage to the polymer coating during installation is reduced by virtue of the greater thickness of the polymer coating layer and the reduced risk of the polymer coating chipping and flaking off because of the higher degree of elasticity.

Finally the individual thread groups which are covered by a foamed polymer coating enjoy a higher degree of flexibility and by virtue of the foam-like enclosure a compressibility so that digging-in engagement of the reinforced ground layer with the textile grating is effected not only by pieces of ground which project through the grating meshes but also by pieces of ground which produce local deformation and compression phenomena in respect of the individual thread groups.

Preferably, individual threads comprising multifilament yarns are adopted in the textile grating according to the invention, as in the state of the art. They are not only covered with the polymer coating but impregnated thereby. In that way each thread of the warp thread groups and the weft thread groups acquires a greater volume and attains compressibility in the procedure involving impregnation and encasing with the foamed polymer coating.

For a ground reinforcement grating, the coating can be formed from PVC (polyvinyl chloride) which is mixed with plasticisers and forms a pasty material which is capable of flow and which gels after immersion of the

grating upon heating to a temperature of about 200°C. Alternatively, it is possible to use polyacrylic or polyurethane coatings which are applied in aqueous dispersions to the textile grating and which polymerise when the water is evaporated. It will be appreciated that it is also possible to use a bitumen-bearing coating which is applied hot.

The gas inclusions in the polymer coating should be as small as possible and preferably should not exceed a size of 0.3 mm.

In a method for producing the textile grating according to the invention, firstly high-strength warp threads and weft threads are connected together in particular by a weaving or knitting procedure in such a way that warp thread groups and weft thread groups which are respectively combined together are each at a spacing of at least 8 mm relative to the respectively adjacent parallel thread group. The thread groups are then wetted with a material which is capable of flow and which contains a polymer-forming substance. This wetting operation is generally effected by immersing the grating in a container with the material which is capable of flow. Alternatively, the material which is capable of flow can be sprayed on to the warp thread groups and the weft thread groups or applied in some other fashion. After the wetting operation the polymer is caused to set. The wetted grating is heated for that purpose, when using polymers which set hot.

The object of the invention is attained by adding to the material which is capable of flow a propellant which produces gas inclusions during setting of the polymer.

As already mentioned, the material capable of flow that can be used can be a pasty mixture of PVC and a plasticiser, which gels under the effect of heat. Alternatively, it is possible to use a polymer dispersion, for example a latex, polyacrylic or polyurethane dispersion, for wetting the grating, wherein the water of the dispersion evaporates under the effect of heat and polymerises the coating.

The propellant is to be selected in dependence on the polymer used and in dependence on the structure wanted for the foamed polymer.

Different propellants for forming gas inclusions are known. For example, gases (for example nitrogen) or liquids which evaporate easily (hydrocarbons, chlorohydrocarbons, trichloroethylene or the like) are used as physical propellants for forming plastic foams. In particular chemical propellants which are suitable for forming the foamed coating according to the invention are those comprising solid materials which decompose at elevated temperature, liberating gases. Examples in that respect are azo compounds (for example azodicarbonamide), N-nitroso compounds and sulphonyl hydrazides which at temperatures between about 100°C and 270°C give off per gram between 100 and 300 ml of nitrogen. Additives, so-called 'kickers' which for example comprise metal compounds such as the Pb and Zn stabilisers in PVC-mixtures make it possible to adjust the temperature at which the gas is liberated.

The structure of the textile grating according to the invention is more clearly apparent from the accompanying drawings showing a preferred embodiment of the grating.

In the drawings:

Figure 1 is a plan view of a grating weave without polymer coating, producing in accordance with German patent No 20 00 937, and

Figure 2 is a plan view of the grating of Figure 1 with coating applied thereto.

The wide-mesh grating or lattice weave shown in Figure 1 has warp thread groups 1 and weft thread groups 2 which are each composed of twelve parallel threads 3 and 3' respectively comprising multifilament polyester yarn. The spacing of the warp thread groups 1 from each other and the spacing of the weft thread groups 2 from each other is about 40 mm. Each warp thread group 1 is accompanied by a leno thread 4 which is passed in a zigzag configuration over the warp thread group 1 and which extends at the respective sides of the warp thread group 1 under a weft thread group 2.

After the weaving procedure the grating weave produced in that way is immersed over its entire width in a bath with a material which is

capable of flow and which contains a polymer-forming substance. In that case, as can be seen from Figure 2, a closed polymer coating 5 is applied around the warp thread groups 1 and the weft thread groups 2 and connects those respective thread groups 1 and 2 to form a respective closed strand. The polymer coating is only of a small thickness (on average less than 1 mm). The gas bubbles enclosed therein are substantially invisible with the naked eye and are of a diameter of less than 0.3 mm. Non-homogeneities in the distribution of the propellant or blowing agent can however also give rise to the existence of locally larger gas bubbles.

Preferably, when the textile grating or lattice is immersed in the material which is capable of flow, all threads of a thread group 1, 2 are connected together and the individual threads 3, 3' are impregnated. Depending on the respective purpose of use involved however, it may also be desirable for the individual threads 3, 3' to be encased only at their outside or not to provide for complete homogenous connection of the individual threads of the yarn groups to each other.

Claims

1. A wide-mesh textile grating for reinforcement purposes in civil engineering, in particular for reinforcing ground layers, comprising weft thread groups (2) and warp thread groups (1) which are connected together preferably by weaving or knitting and which are each at a spacing of at least 8 mm relative to the respectively adjacent parallel thread group (1, 2) and the individual threads (3, 3') of which are formed by high-strength yarns, wherein the warp thread groups (1) and the weft thread groups (2) of the textile grating are covered by a polymer coating (5), characterised in that the polymer coating (5) contains regularly distributed gas inclusions so that the polymer coating (5) is of a foam-like structure.

2. A textile grating according to claim 1 characterised in that the individual threads (3, 3') of the warp thread group (1) and the weft thread group (2) comprise multifilament yarns which are impregnated by the foam-like polymer coating (5).

3. A textile grating according to claim 1 or claim 2 characterised in that the polymer coating (5) comprises PVC.

4. A textile grating according to one of the preceding claims characterised in that the gas inclusions are of a diameter of less than 1 mm, preferably less than 0.3 mm.

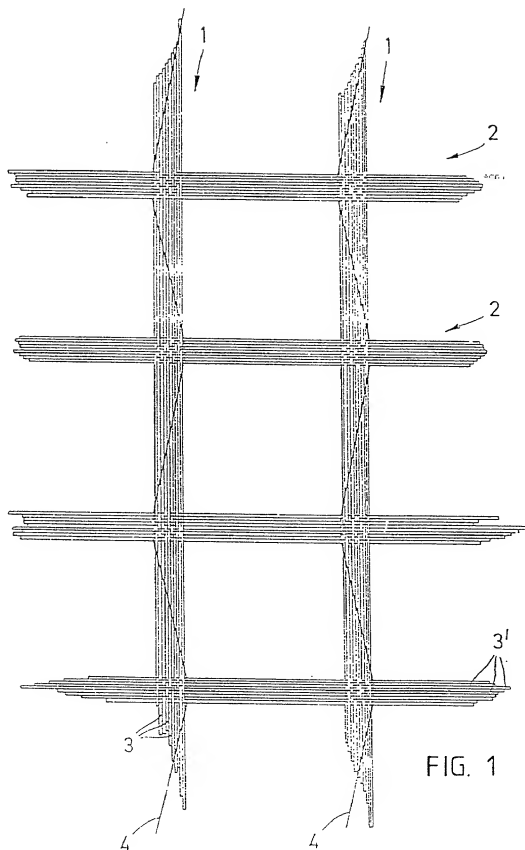
5. A method of producing a textile grating in which high-strength warp threads (3) and weft threads (3') are connected together in particular by a weaving or knitting procedure in such a way that they are respectively combined together to form warp thread groups (1) and weft thread groups (2) which are each at a spacing of at least 8 mm with respect to the respectively adjacent parallel thread group (1, 2), and

wherein the thread groups (1, 2) are then wetted with a material which is capable of flow and which contains a polymer-forming substance and are covered with a coating (5) by virtue of setting of the polymer, characterised in that added to the material which is capable of flow is a propellant which produces gas inclusions during setting of the polymer.

6. A method according to claim 5 characterised in that the pasty mixture comprises PVC mixed with a plasticiser and that the textile grating is heated to a high temperature, preferably about 200°C, for gelling the polymer coating of PVC.

7. A method according to claim 5 characterised in that the material which is capable of flow is formed by a polymer dispersion, for example a latex, polyacrylic or polyurethane dispersion, and that the textile grating is heated to a high temperature above 100°C for evaporation of the water contained in the dispersion and for polymerisation.

8. A method according to one of claims 5 to 8 characterised by the use of a propellant which liberates gas bubbles at a high temperature of over 100°C.



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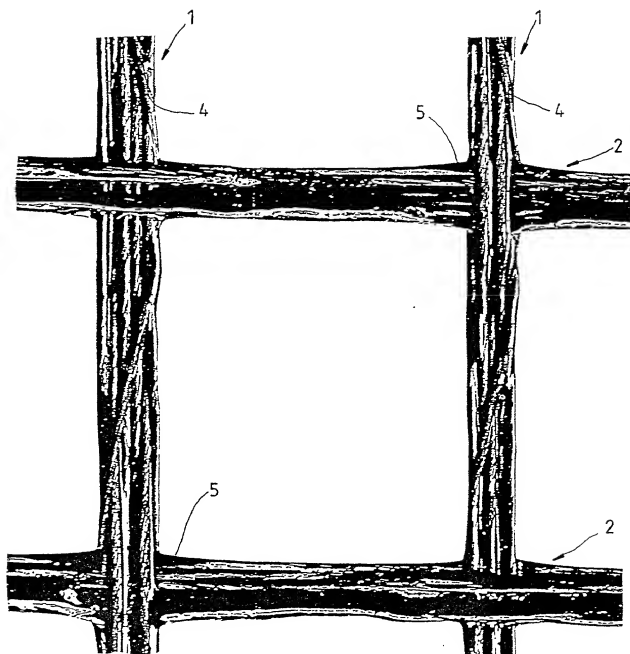


FIG. 2

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TEXTILE GRATING

the specification of which was filed on July 18, 2000 as United States Application Number 09/600,518

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulation, §1.56. I hereby claim foreign priority benefits under Title 35, United States Code, §119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate disclosing the subject matter claimed in their application and having a filing date (1) before that of the application on which priority is claimed, or (2) if no priority is claimed, before the filing date of this application.

Prior foreign Application(s)

| Number | Country | Day/Month/Year Filed | Priority Claimed |
|-----------------------------|---------|----------------------|------------------|
| PCT App. No. PCT/EP99/00067 | PCT | 08/01/99 | (X) Yes () No |
| DE App. No. 19803 168.8 | Germany | 28/01/98 | (X) Yes () No |

I hereby claim the benefit under Title 35, United States Code, §120/365 of any United States application(s) listed below and PCT International Applications listed above or below, and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

| (Application Number) | Day/Month/Year Filed | Status (Patented, Pending, Abandoned) |
|----------------------|----------------------|---------------------------------------|
|----------------------|----------------------|---------------------------------------|

I hereby appoint Donald W. Muirhead, Reg. No. 33,978; Anne E. Saturnelli, Reg. No. 41,290; and David Suhl, Reg. No. 43,169 as attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Address all telephone calls to Donald W. Muirhead at telephone number (617) 951-6676. Address all correspondence to:

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101 Federal Street
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Inventor's signature Heiko PINTZ Date August 28th, 2000

Full name of sole or first inventor (given name, family name) Heiko PINTZ

Residence Siegerlandstrasse 20, D-48527, Nordhorn, Germany Citizenship GERMAN

Post Office Address (include zip code) same